W. E. Adeney, made an extensive survey of the more important estuaries around the British coasts, in order to obtain data on the question of standards for tidal waters in relation to offensive putrefaction and injury to fish. The results of this inquiry, together with much other relevant matter, were published in 1908 as an appendix to the Fifth Report of the Commission, and form a document of first importance, which has become classic in this branch of work. As the recognised authority on estuarine pollution, Prof. Letts took part in many Local Government Board inquiries and legal proceedings connected with his subject.

NOTES.

THE following fifteen candidates have been selected by the council of the Royal Society to be recommended for election into the society:—Charles Bolton, Henry C. H. Carpenter, Thomas A. Chapman, Gerald P. L. Conyngham, C. Clifford Dobell, Ernest Gold, Henry B. Guppy, Albert G. Hadcock, Archibald V. Hill, James C. Irvine, Thomas Lewis, Srinivasa Ramanujan, Arthur W. Rogers, Samuel Smiles, and Frank E. Smith.

THE meeting of the British Association, which it was hoped would be held in Cardiff this year, has been cancelled. The Local Committee has reluctantly decided that satisfactory arrangements could not be made to ensure success for the meeting, and has sent a resolution to that effect to the council of the association. The council has accepted this view, so that for two years in succession the annual assembly of workers in all departments of science will not take place. Sir Arthur Evans has consented to occupy the office of president for another year, and there will be a statutory meeting in London on July 5 to receive reports of committees and transact other business, but otherwise the corporate life of the association will continue in a state of suspended animation, though there never has been a more favourable time than now to make the nation realise the debt it owes to science for the successful conduct of the war and the need for unceasing scientific activity to prepare for the industrial struggle which the future must bring.

FOR the last three years the Royal Society of Edinburgh has adopted a new method for electing new fellows. The date of election is the first Monday of March of each year, and all candidates recommended by fellows must have their forms of recommendation sent in before the end of the preceding November. Since this improved method was adopted the general interest in the election has greatly increased, the number of new fellows each year varying from sixteen to twenty-one. At the meeting held on March 4 the following were elected fellows of the society:—D. Ballsillie, F. J. Blight, A. Bremner, J. M. Campbell, A. S. Dodd, T. L. Galloway, W. F. Gray, P. S. Hardie, J. R. L. Kingon, G. J. Lidstone, J. D. McCulloch, W. Mackie, W. P. Paterson, G. W. Tyrrell, C. Whyte, and J. T. Wight.

THE King has given orders for the appointment of Surgeon-General Sir Alfred Keogh, G.C.B., to the Order of the Companions of Honour for services in connection with the war.

WE regret to see the announcement in the *Morning Post* that Prof. P. Blaserna, Vice-President of the Senate, and professor of experimental physics in the University of Rome, died on February 26, at eighty-two years of age.

CAPT. J. C. MCWALTER, of Dublin, has been awarded the Carmichael prize of the Royal College of Surgeons in Ireland, value 100*l.*, for an essay on the state of the medical profession.

THE triennial Henry Saxon Snell prize of the Royal Sanitary Institute, consisting of a medal and the sum of fifty guineas, will be awarded this year for an essay on "Suggestions for Improvements in Apparatus and Appliances for Dealing with House Refuse."

THE fourth Guthrie Lecture of the Physical Society of London will be delivered at 5 p.m. on Friday, March 22, at the Imperial College of Science, South Kensington, by Prof. J. C. McLennan, of the University of Toronto. The subject will be "The Origin of Spectra."

IT is stated in the *Times* that Capt. Roald Amundsen intends to leave Norway this summer in his new Arctic vessel *Maud,* which has been specially built for his attempt to reach the North Pole. The vessel is provisioned and fitted out for a seven years' stay in the ice, but Capt. Amundsen hopes to be back again within four years.

WE learn that last year the Imperial Museum of Natural History in Vienna began a new series of publications, the *Denkschriften,* to include larger works needing more extensive illustration than could be attempted in the well-known *Annalen.* The first volume is an important monograph by Dr. G. Schlesinger on the remains of Mastodon in the Vienna Museum, illustrated by thirty-five plates.

THE Geological Department of the British Museum (Natural History) has received as a gift from Mr. S. L. Wood two portions of Ichthyosaurus showing the skin and other soft parts, from the Lias of Barrow-on-Soar, Leicestershire. The skin of the paddle seems to have been ornamented with rosettes of dark spots. Among the stomach contents are hooklets from the arms of cuttle-fishes which have been eaten.

THE following officers and council of the Geological Society have been elected for the ensuing year:—*President,* G. W. Lamplugh; *Vice-Presidents,* R. M. Deeley, Dr. A. Harker, Prof. W. J. Sollas, and Sir J. J. H. Teall; *Secretaries,* Dr. H. H. Thomas and Dr. H. Lapworth; *Foreign Secretary,* Sir Archibald Geikie; *Treasurer,* Dr. J. V. Elsden; *Other Members of Council,* Dr. C. W. Andrews, Dr. F. A. Bather, Prof. J. Cadman, Dr. A. M. Davies, Prof. E. J. Garwood, J. F. N. Green, Dr. F. L. Kitchin, Major H. G. Lyons, Prof. J. E. Marr, R. D. Oldham, R. H. Rastall, Prof. H. H. Swinnerton, S. H. Warren, and Prof. W. W. Watts.

THE officers and members of council of the Institute of Chemistry for the ensuing year have been elected as follows:—*President,* Sir Herbert Jackson; *Vice-Presidents,* H. Ballantyne, W. T. Burgess, C. F. Cross, Sir J. J. Dobbie, Dr. A. Harden, and Sir Robert Robertson; *Hon. Treasurer,* A. G. Salamon; *Members of Council,* E. C. C. Baly, C. O. Bannister, Dr. O. L. Brady, H. C. H. Candy, A. C. Chapman, C. H. Cribb, Dr. J. T. Dunn, E. M. Hawkins, Dr. G. G. Henderson, P. H. Kirkaldy, H. G. Lacell, Dr. A. Lauder, J. H. Lester, F. J. Lloyd, W. Macnab, Prof. G. T. Morgan, D. Northall-Laurie, G. H. Perry, F. M. Potter, W. Rintoul, H. Silvester, G. Stubbs, Dr. J. F. Thorpe, T. Tickle, L. E. Vlies, E. White, and W. M. G. Young.

AN extension of the Fourth Northern General Hospital at Lincoln was opened on March 1 by

General Sir William Robertson, who, in the course of an address, pointed out the debt which the Army owes to medical science and skilful nursing. In past campaigns the mortality from sickness and epidemic disease was great, and was accepted as more or less non-preventable; but in the present war, with millions of men engaged in many different theatres of operations, some of them notoriously unhealthy, there has not been a single epidemic of any kind. The achievements of the Medical Service in this war constitute a bright spot on a picture which in many respects can be regarded only with sorrow and sadness.

A VERY important memorandum is issued by the Board of Agriculture and Fisheries as the second interim report of the Fresh-water Fish Committee. It deals with the economic value of the British eel fisheries, and deserves the widest publicity during the coming months. There are enormous runs of elvers in Great Britain and Ireland, so much so that many millions of these fish were formerly exported alive to Germany, for cultivation, from one catching depôt on the Severn. This depôt is now closed, and the Committee suggests that it should be taken over. The eel is the only popular fresh-water fish in these islands which is at the same time potentially highly abundant. The Committee is preparing schemes for intensive cultivation, now and after the war, and suggests the probability of a large export trade in the future. All persons interested in schemes of immediate eel culture should procure this report and advice from the Board of Agriculture and Fisheries (43 Parliament Street, London, S.W.1) or from the Fresh-water Fish Committee. The address of the secretary of the latter is the Hon. A. S. Northcote, 54A Parliament Street, London, S.W.1.

MANY of the accepted ideas regarding the electric arc seem to be undergoing some revision. At the meeting of the Illuminating Engineering Society held on February 26 Lt.-Com. Haydn T. Harrison mentioned several interesting respects in which some of the latest high-candle-power arc searchlights differ from the older and simpler types. In the new lamps the intrinsic brilliancy attained is as much as 250,000–300,000 c.p. per square inch, as compared with 80,000–90,000, which was formerly considered the limit likely to be attained. It was pointed out by Mr. A. P. Trotter so long ago as 1892 that the candle-power in any direction from a flat arc crater can be determined with fair accuracy from Lambert's law, and that the polar curve of light distribution (neglecting the shadow cast by the negative carbon) is approximately a circle. This law is so definite that if photometric measurements, when plotted, yield a different curve it is proof that the source of light is not a plane surface, but convex. In the high-candle-power searchlight lamp developed during the last few years this phenomenon occurs despite the fact that there is a very deep crater. It therefore appears that the gaseous contents of the crater actually boil over, and thus change the plane surface into a convex-shaped source of light.

DR. HUGO DE VRIES, professor of botany in the University of Amsterdam, has just completed his seventieth year. His long connection with the University has been marked by patient and successful investigations on "sporting" among plants, especially in *Oenothera Lamarckiana*, a plant which had become naturalised in Holland. His work with Œnothera began in 1895, and an article upon it appeared in NATURE of November 26, 1908 (vol. lxxix., p. 101), when the Hortus Botanicus at Amsterdam was the subject of a contribution to our series of "Scientific Centres." Out of the work and the experiments that had led up to it the "mutation theory" of evolution originated and developed. Prof. de Vries gave an account of this theory and of his researches in the Masters memorial lectures, which he delivered before the Royal Horticultural Society in 1909 (he was the first Masters memorial lecturer), and his great book, "Die Mutationstheorie," has been ably translated into English by Prof. J. B. Farmer and A. D. Darbishire. The fundamental idea of unit characters upon which the whole argument rests has been at the back of almost all recent research into heredity in plants, and the development of Mendel's work, which had been so long overlooked, was prepared for, and aided not a little by, the researches de Vries made with Œnothera and other plants. This work has had a profound effect upon our outlook towards, and knowledge of, the origin and development of horticultural varieties of plants. In order to mark its appreciation of the great value of this work the council of the Royal Horticultural Society has conferred upon Prof. de Vries one of the Veitch memorial medals—a gold medal awarded only to those whose researches have had, or are likely to have, great influence in the advancement of horticulture.

AN article in *La Nature* for February 16, under the title "Efficacité des Bombardements Terrestres et Aériens," is worthy of note. The writer remarks that the frequency of air raids has caused no little speculation as to the probability of personal danger during such raids. He proceeds to state the manner in which the laws of probability can be applied to estimate the chance of a shell falling at any particular spot near the target when the mean errors in range and direction are known. Turning to the question of bombardment from the air, figures are quoted from the *Aeroplane* giving the chances of a person receiving injury, and calculated on the assumption that a certain definite area surrounding the point of impact of a bomb is dangerous, and that bombs are equally likely to fall at any place in London. The results of these calculations were given in the *Aeroplane* as a table, which *La Nature* reproduces. The chance of danger is given as one in 150,000 in open spaces for each bomb dropped, while in a well-built house the chance is of the order of one in 50,000,000. These figures were based on the casualties during raids over London. One obvious weakness of the argument is that the bombs are not equally likely to fall anywhere, so that the danger is proportionately greater to those living near well-defined targets. The writer in *La Nature*, in applying these figures to Paris, expresses the opinion that the chances of injury are greater in that city than in London. He considers that the protection due to buildings has been over-estimated in the *Aeroplane*, especially if the buildings are not well constructed. The density of buildings is greater in Paris, and the houses are usually higher and more densely peopled. Making allowance for these facts, the French writer considers that the dangers in Paris are about twice as great as in London during an aerial bombardment.

SOME remarks made in the House of Commons on February 21 by Sir Watson Cheyne, dealing with the question of "The Medical Aspect of Flying," or, as it would be more correctly described, "The Physiology of the Airman," have attracted wide attention. While all men of science would doubtless support the institution of a special service to devote attention to the troubles which happen to the airman on account of his ascent to high altitudes, it cannot be too strongly pointed out that the problem is essentially one for the physiologist. Naturally, the airman is liable to the numerous other ailments that beset us all, so that the air medical service requires the inclusion of men with a certain knowledge of these. But the most important aspect by far is a thorough acquaintance with all the various forms of distress induced by deficient supply of oxygen. It would seem to the layman, and apparently to many medical men also, a rather extraordinary thing that something which appears to concern respiration alone should produce vomiting, whereas the excellent work of Dr. J. S. Haldane and his collaborators, and of other physiologists also, has shown beyond question that the multitude of diverse symptoms caused by high altitude are results, simply and solely, of low oxygen tension. Sir Watson Cheyne is scarcely explicit enough here, and his statement that the lungs are primarily affected may easily be misunderstood. What is needed is a regular and periodic testing of the reactions of the airman to reduced oxygen pressure, and this by the accurate methods of the physiological laboratory. The nervous factors referred to by Sir Watson Cheyne require investigation at regular intervals by the expert experimental psychologist. The length of the reaction time is so obviously important that it needs no further reference. The effects on the nerve centres of repeated exposure to deficient oxygen need more experimental investigation. It is, however, satisfactory to find that more attention is being given to the preliminary testing of men destined for the Air Service.

AN editorial article entitled "Gunfire in France, Rainfall in England," by Dr. H. R. Mill, in the February issue of *Symons's Meteorological Magazine*, comprises an analysis of the monthly rainfall returns for the south-eastern and north-western districts of the British Isles for the wet period 1909–17, considered in subdivisions of two three-year peace-periods and one three-year war-period. The rainfall for each month and for both regions is given in percentage of the thirty-five-year average, 1875–1909, the stations utilised being those employed in "British Rainfall," as specially representative of the districts. Without exhibiting the data, it is impossible in the space at our disposal adequately to deal with the salient features of the investigation; suffice it to say that, in Dr. Mill's words, "they bear very strong evidence to the effect that the abnormalities of the rainfall of the war-years are merely the natural development of changes which have certainly been at work for nine years, and in one case no less certainly for fifty years." This last reference is to the increasing dryness of September, shown by Dr. Mill to have been a feature of the climatology of the British Isles during the past half-century, and is, indeed, a matter of common observation. Attention is directed to the noteworthy fact that not one of the four war Septembers has had so much as average rainfall. It is important, moreover, to observe that while 1915 and 1916 had both an excess rainfall of 21 per cent. in south-east England, 1917 (which certainly witnessed no relaxation in the activity of artillery) was a year of nearly normal fall (+4 per cent.). In the same number Mr. F. J. Brodie replies to those who have criticised his treatment in the issue of December, 1917, of the same problem, and incidentally suggests a statistical process by which he considers it might be possible definitely to decide the point at issue.

AT the annual general meeting of the Institute of Chemistry held on March 1, Sir James Dobbie, the retiring president, said that the past three years have afforded unusual opportunities for demonstrating the utility of the institute, and the special services which it has rendered in connection with the war have been widely acknowledged. It has done valuable work in introducing suitable candidates for commissions in his Majesty's Forces where technical knowledge and experience are required, and in providing chemists for Government factories, controlled establishments, and laboratories engaged in war work. Every public department and every branch of the fighting services that requires the aid of the chemist has made use of its services. The institute may fairly claim to have been the chief agent in mobilising the chemists of the country for war purposes. Since the beginning of the war the institute has been unremitting in its efforts to ensure to chemists a supply of pure reagents, glass, and porcelain. The value of the glass research work carried out under its auspices has been recognised on all sides, and investigations originally undertaken for purely chemical purposes have been extended for the benefit of nearly every branch of the glass industry. The attention of the council has been largely devoted to the revision of the regulations for admission to the membership of the institute, with the view of promoting complete organisation of British professional chemists. Sir James Dobbie hopes the institute will undertake to maintain a register for persons engaged in chemistry, but not necessarily qualified for admission as members. Such an organisation would make it possible, when occasion demanded, for the chemists of the country to bring their whole weight and influence to bear on questions of national interest.

WE have lately received from Messrs. Wood Bros. Glass Co., Ltd., Barnsley, a copy of their new catalogue of scientific and laboratory glassware, covering a considerable variety of useful chemical apparatus. When we recollect that three years ago the difficulty of securing supplies of such articles seriously menaced many industries connected with the prosecution of the war, and when we realise the difficulties which had to be overcome to establish this entirely new branch of industry—so far as this country is concerned—we may well congratulate the enterprising manufacturers who have made such a noteworthy endeavour to provide our chemists with these essential requirements. The production of chemical glassware presented many unusual problems for solution. In devising the formulæ for batch mixtures, Messrs. Wood Bros. and other firms have been assisted by the Glass Research Committee of the Institute of Chemistry; but they have had to provide special plant, machinery, and moulds, to determine the conditions of working, as well as to secure the services of workers possessing the necessary technical skill for making many articles of intricate design. With the increasing appreciation of the value of science in industry and the extension of science teaching in our schools, the demand for laboratory glassware is likely to be far greater than it has been in the past, and we hope that every encouragement will be given to the British makers who have achieved such success in spite of the serious obstacles with which they have been confronted. We hope, too, that it is thoroughly recognised by this time that this country must be able to supply its own needs in this direction, and that the industry must therefore be properly protected in order that it may become so well established here that there will be no inclination or necessity to look to other countries to provide us with anything of the kind. We shall look forward to seeing future issues of Messrs. Wood Bros.' catalogue, and anticipate that in the course of the present year the range of production will be substantially extended.

IT is a matter of common experience in the fattening of cattle that the gain in live-weight secured per unit of feed consumed diminishes as the fattening progresses. Of the various causes that may contribute to this result the one that is perhaps most commonly regarded as being mainly responsible is the supposed less efficient utilisation of feed by the fattened as compared with the thin animal, the unit of a resorbed nutrient producing, according to this view, less fat in the latter case, while the heat production of the body should be correspondingly greater. In order to test this view by a direct comparison of the utilisation of feed energy by the same animal in ordinary condition and when well fattened an investigation has been carried out by Messrs. H. P. Armsby and J. A. Fries at the Institute of Animal Nutrition of the Pennsylvania State College, the results of which are published in the *Journal of Agricultural Research,* vol. xi., No. 10. No difference was found in the efficiency of digestion of the food by the animal in lean or fat condition, nor was there any measurable difference in the percentage of the gross energy of the feed which was metabolisable. The heat increment resulting from the consumption of a unit of feed was but little greater, and consequently the net energy value of the feed but slightly less, in the fattened than in the unfattened condition. The increased maintenance requirement of the fattened as compared with the lean steer was greater than corresponded with the increase in weight or in computed body surface. The lower economic efficiency of the fattened animal in this experiment was thus due chiefly to his higher maintenance requirement, and only to a small extent, if at all, to a difference in the utilisation of the surplus of feed above the maintenance requirement.

A NEW instrument for the determination of sea-water densities on board ship is described by Mr. A. L. Thomas in the Journal of the Washington Academy of Sciences for December 19, 1917 (vol. vii., No. 21). It is a modification of the total immersion hydrometer, and consists essentially of a test-tube containing the float, or bobbin, and the liquid to be measured, a stirred variable temperature bath, and a thermometer. The bobbin is about 5 cm. long and 12 mm. in diameter, and is made of Jena glass. The glass test-tube holds 15 to 30 c.c. of the water to be tested. The temperature bath, of copper and glass, holds about 270 c.c. of water, and can be rapidly heated electrically. The method of making a determination depends on noting the precise temperature at which the liquid to be tested is exactly of the same density as the bobbin, which is, of course, when the bobbin neither sinks nor rises. By taking the mean of the readings approaching the equilibrium temperature from a higher and a lower temperature the result may be obtained to 0·05° C. It is claimed that the apparatus is simple and rapid to work, requires a small amount of the water to be tested, and gives accurate results.

IN the paper on "Switchgear Standardisation" which Dr. C. C. Garrard read to the Institution of Electrical Engineers on February 21 many subjects were discussed which are of special interest at the present time. In connection with research, Dr. Garrard pointed out that while the Department of Scientific and Industrial Research expends a few hundred pounds on "switching and arcing," a single Berlin firm had recently expended about a hundred times as much in building a laboratory for the specific purpose of testing oil switches alone. He suggests that the electrical industry and the Government should co-operate for the purpose of providing a national high-tension research and standardising laboratory. We see no reason, however, why existing laboratories should not be utilised in the first place to the fullest possible extent. Several grandiose schemes on a similar scale have been discussed by various committees recently. They all start with the assumption that generous financial support will be given by the Government. In the discussion several speakers pointed out that standardisation has its limitations. It would be foolish, for instance, to standardise devices which are being improved from day to day. Such a procedure would simply mean the placing of an embargo on invention. Mutual co-operation is in every way desirable, but when interests are antagonistic it cannot be obtained. To force private firms to pool their information for the general good would in many cases simply amount to confiscation of capital; it is only human that manufacturers should desire to keep their trade secrets. The question also as to how far it is desirable to make devices "fool-proof" was discussed. The general opinion was that the great series of campaigns originated in America with the cry of "safety first" has now gone too far. To expend ingenuity in making devices "fool-proof" is desirable, but to try to make them absolutely "fool-proof" is in many cases pure waste of time.

FROM the specific gravities of certain substances, that of water at different temperatures, and those of the solutions of these substances in water, Mr. J. N. Rakshit has calculated the contraction of volume resulting when a fixed quantity of each substance is dissolved in increasing quantities of water. The results are tabulated in the Proceedings of the Indian Association for the Cultivation of Science (vol. iii., part iv.), the substances dealt with being hydrochloric, sulphuric, nitric, formic, acetic, and tartaric acids; stannic and sodium chlorides; ammonia, sodium, and potassium hydroxides; methyl, ethyl, propyl, *iso*butyl and *iso*amyl alcohols, glycerol, phenol, dextrose, lævulose, maltose, invert- and cane-sugars, acetone, chloral hydrate, acetonitrile, and nicotine. Study of the figures obtained shows that in some cases the contraction of volume increases with the increase in dilution, but in several others as the dilution increases a point of maximal contraction is observed. The maximum contractions are constants, and different for different substances. In the cases of sodium chloride and of acetic and sulphuric acids the contraction of volume at all dilutions diminishes as the temperature rises. It is not yet known whether this phenomenon is due to differences in the coefficients of expansion of water and of the solute.

A NEW book by Sir Ray Lankester is being brought out by Messrs. Methuen and Co., Ltd., entitled "Secrets of Earth and Sea," in which the following subjects will be dealt with:—The mammoth as drawn by those who lived with it; the "rostro-carinates"—the earliest works of man; Vesuvius in eruption; pond-life; gregarines and malaria; a mere worm (the earth-worm); what is meant by a species; the classification of animals; geological strata; about fishes (flying-fish, climbing-fish, blind-fish, cave-fish, deep-sea fish); the races of man; Darwinism and war; German culture; spider-sense and nonsense; belief and evidence; the Svastika. Other books in Messrs. Methuen's new list are:—"Glossary and Notes on Vertebrate Palæontology," the Rev. S. A. Pelly; "The Fisheries of the North Sea," N. Green; and "Food and Garden," H. A. Day.

CATALOGUE No. 71, just issued by Messrs. Dulau and Co., Ltd., 37 Soho Square, W.1, contains particulars of books and papers from the library of the late Dr. A. M. W. Downing, and other sources. It refers in the main to works on astronomy and astrophysics, but also gives the titles of books relating to engineering, geology, and mathematics.